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Contact information

Faculty of Economics and Management

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Bozen-Bolzano

Current position

From / to	October 2021 / today
Academic Institution	Free University of Bolzano-Bozen, Faculty of Economics and Management
SSD	SECS-S/01

Education and training

From / to	November 2020 / October 2021
Academic Institution	University of Bologna, Department of Statistical Sciences
Academic level	Post Doc
Project	Threshold Autoregressive Moving-Average models: probabilistic structure and inferential problems.
Subject area	Time series analysis & econometrics
Supervisor	Prof. Simone Giannerini
External Supervisors	Prof. Anders Rahbek & Prof. Howell Tong

- Explore the connections between the theory of stochastic stability of Markov chains and nonlinear time series models with particular emphasis on threshold models
- Develop tests for nonlinearity that compare linear ARMA specifications against TARMA models
- Study bootstrap inference within the TARMA framework

<p>From / to Academic Institution Academic level Project Subject area Supervisor External Supervisors</p>	<p>Research fellowship November 2019 / October 2020 University of Bologna, Department of Statistical Sciences Post Doc Probabilistic aspects and statistical inference for Threshold Autoregressive Moving-Average models. Time series analysis & econometrics Prof. Simone Giannerini Prof. Howell Tong • Develop a test for a linear ARMA model against TARMA model • Study the continuous-time extension of TARMA models • Study possible practical applications of TARMA models</p>
<p>From / to Academic Institution Academic level Project Subject area Supervisor External Supervisors</p>	<p>Research fellowship November 2018 / October 2019 University of Bologna, Department of Statistical Sciences Post Doc Threshold Autoregressive Moving-Average models: probabilistic structure, statistical aspects and applications. Time series analysis & econometrics Prof. Simone Giannerini Prof. Kung-Sik Chan & Prof. Howell Tong • Study the probabilistic structure of TARMA models with emphasis on its stationary distribution • Face the problem of inference for TARMA models • Study possible application of TARMA model in different fields</p>
<p>Cycle Date Institution Title Supervisor External Supervisors Evaluation</p>	<p>PhD in Statistics (with grant) XXXI April 9, 2019 University of Bologna, Department of Statistical Sciences Threshold Autoregressive Moving-Average models: probabilistic structure, statistical aspects and applications. Prof. Simone Giannerini Prof. Kung-Sik Chan & Prof. Howell Tong Ottimo</p>
<p>Date Institution Title Subject Supervisor Evaluation</p>	<p>Second level degree in Statistical, Financial and Actuarial sciences June 9, 2015 University of Bologna, Department of Statistical Sciences (Campus of Rimini) A probabilistic analysis of dichotomic classes derived from a mathematical model of the genetic code. Stochastic processes Prof. Simone Giannerini 110/110 <i>cum laude</i></p>
<p>Date Institution Title Subject Supervisor Evaluation</p>	<p>First level degree in Mathematics July 18, 2013 University of Perugia, Department of mathematics and computer science The principle of arbitrage in complete and incomplete markets. Probability Prof. Giuliana Regoli 110/110 <i>cum laude</i></p>

Date	2010
Institution	Liceo Scientifico Giuseppe Mazzatinti
Evaluation	100/100 <i>cum laude</i>

Research topics

My main research interests concern mathematical statistics and probability theory. I have been building a strong theoretical background in the key areas of mathematical statistics. In particular, I have been dealing both with probabilistic and statistical issues in univariate and multivariate time series analysis and categorical data analysis. I have been studying both standard asymptotic theory and bootstrap theory. This allowed me to have fruitful collaborations not only with statisticians and econometricians but also with experts of different disciplines such as economists, physicists, mathematicians and molecular biologists. I have deployed my expertise to design methods to analyse different real world phenomena. See below for details.

- **Non-linear time series**
 - Probabilistic structure of stochastic difference equations
 - Asymptotic theory
 - Threshold Autoregressive Moving-average models
 - Bootstrap inference in time series analysis
 - Robust inference in time series analysis
 - Threshold diffusion processes
 - Model selection
- **Asymptotic theory for categorical data**
 - Small sample asymptotics for goodness-of-fit tests
- **Mathematical and statistical models for the genetic code**
 - Non-power representation systems and the genetic code
 - Circular codes in translation

Research grants

Funding body	Free University of Bozen/Bolzano
Position	Principal Investigator
From / to	December 2021/ December 2023
Institution	Free University of Bozen/Bolzano, Faculty of Economics and Management
Project	Threshold Autoregressive Moving-Average models in ECONomics (TARMAECON)
Grant	10000€

Funding body	Free University of Bozen/Bolzano
Position	Principal Investigator
From / to	October 2021/ August 2022
Institution	Free University of Bozen/Bolzano, Faculty of Economics and Management
Project	Efficient statistical analysis of mixed-type data with applications to business economics and epidemiology
Grant	8000€

Funding body	<i>COST action CA17120</i>
Description	Scientific visit
From / to	September 2020 / October 2020
Institution	University of Copenhagen, Department of Economics
Project	Bootstrap inference for threshold models in time series analysis
Supervisor	Prof. Anders Rahbek
Grant	3500€

Research visits

Date	July 2018 – February 2019
Institution	University of Iowa, Department of Statistics and Actuarial Science
Supervisor	Prof. Kung-Sik Chan

Visiting Scholar

Date	October 2016 – September 2017
Institution	University of Iowa, Department of Statistics and Actuarial Science
Supervisor	Prof. Kung-Sik Chan

Publications in scientific journals and books

- [P1] Goracci G.; Giannerini S.; Chan K.-S. Tong H. “*Testing for threshold effects in the TARMA framework.*”, **Statistica Sinica**, *in press*, 2021, DOI number: 10.5705/ss.202021.0120 [Scientific article]
- [P2] Giannerini S.; Gonzalez D. L.; Goracci G.; Danielli A. “*A role for circular codes properties in translation.*”, **Scientific Reports**, 2021, 11, pp. 1 - 15 [Scientific article]
- [P3] Goracci G. “*An empirical study on the parsimony and descriptive power of TARMA models.*”, **Statistical Methods & Applications**, 2021, 30(1), pp. 109 - 137, <https://doi.org/10.1007/s10260-020-00516-8> [Scientific article]
- [P4] Goracci G. “*Revisiting the Canadian lynx time series analysis through TARMA models.*”, **Statistica**, 2020, 80(4), pp. 357 - 394 <https://doi.org/10.6092/issn.1973-2201/11478> [Scientific article]
- [P5] Chan K.-S.; Goracci G. “*On the Ergodicity of First-Order Threshold Autoregressive Moving-Average Processes*”, **Journal of Time Series Analysis**, 2019, 40(2), pp. 256 - 264, <https://doi.org/10.1111/jtsa.12440> [Scientific article]

Refereed conference proceedings

- [CP1] Diaz Rubio G.A.; Giannerini S.; Goracci G. “*On the asymptotic mean-squared prediction error for multivariate time series.*”, in: PROCEEDINGS of the 50th scientific meeting of the Italian Statistical Society, 2021, pp. 1 - 6 (atti di: 50th scientific meeting of the Italian Statistical Society, Pisa, June 21 – June 25, 2021) [Contribution to conference proceedings]
- [CP2] Giannerini S.; Goracci G. “*Asymptotics and power of entropy based tests of dependence for categorical data.*”, in: PROCEEDINGS of the 48th scientific meeting of the Italian Statistical Society, 2016, pp. 1 - 6 (atti di: 48th scientific meeting of the Italian Statistical Society, Salerno, June 8 – June 10, 2016) [Contribution to conference proceedings]

Abstracts

- [A1] Giannerini S.; Danielli A.; Gonzalez D. L.; Goracci G. “*A role for circular code properties in translation.*”, in: Code biology 2021, book of abstracts, 2021, pp. 28 - 28 (atti di: Code Biology 2021, Lužnica 31 August – 4 September 2021) [Abstract]
- [A2] Gonzalez D. L.; Boulay J.Y.; Giannerini S.; Goracci G. “*Mathematical regularities in the genetic code: a unifying view based on symmetry and group theory.*”, in: Code biology 2021, book of abstracts, 2021, pp. 7 - 7 (atti di: Code Biology 2021, Lužnica 31 August – 4 September 2021) [Abstract]
- [A3] Giannerini S.; Gonzalez D. L.; Goracci G. “*Evolution and Degeneracy in the Genetic Code.*”, in: Code biology 2019, book of abstracts, 2019, pp. 40 - 40 (atti di: Code Biology 2019, Friedrichsdorf, 3 - 7 June 2019) [Abstract]
- [A4] Goracci G.; Giannerini S.; Gonzalez D. L. “*Dichotomic Classes and Entropy Optimization in Coding Sequences.*”, in: Code biology 2018, book of abstracts, 2018, pp. 34 - 34 (atti di: Code Biology 2018, Granada, 5 - 9 June 2018) [Abstract]
- [A5] Giannerini S.; Goracci G. “*Small Sample Asymptotics for Multinomial Goodness of Fit Tests.*”, in: IMPS 2017, book of abstracts, 2017, pp. 25 - 25 (atti di: International Meeting of the Psychometric Society 2017, Zurigo, 17 - 21 July 2017) [Abstract]
- [A6] Giannerini S.; Goracci G. “*Asymptotics and power of entropy based tests of dependence for categorical data.*”, in: CompStat 2016, book of abstracts, 2016, pp. 32 - 32 (atti di: 22nd International Conference on Computational Statistics, Oviedo, 23-26 August 2016) [Abstract]

Working Papers and Technical Reports

- [WP1] Chan K.-S.; Giannerini S.; Goracci G.; Tong H. “*Unit-root test within a Threshold ARMA framework.*”, **submitted**, <https://arxiv.org/abs/2002.09968>
- [WP2] Giannerini S.; Goracci G.; Rahbek A. “*The validity of bootstrap testing in the threshold framework.*”, **submitted**, <https://arxiv.org/abs/2201.00028>
- [WP3] Giannerini S.; Goracci G. “*Entropy Based Analysis and Tests for Time Series in R with the Package tseriesEntropy.*”, **submitted**
- [WP4] Goracci G.; Giannerini S.; Rahbek A. “*A bootstrap diagnostic test against non-linear alternatives for time series models.*”
- [WP5] Goracci G.; Giannerini S.; Tong H. “*Markov Chains and the probabilistic structure of non-linear time series models.*”
- [WP6] Diaz Rubio G.A.; Giannerini S.; Goracci G. “*Multivariate Misspecification-Resistant Information Criterion.*”
- [WP7] Diaz Rubio G.A.; Giannerini S.; Goracci G. “*Model selection via information and prediction criteria: a survey.*”
- [WP8] Giannerini S.; Goracci G. “*Small Sample Asymptotics for Multinomial Goodness of Fit Tests.*”
- [WP9] Giannerini S.; Gonzalez D. L.; Goracci G. “*Dichotomic Classes and Entropy Optimization in Coding Sequences.*”

Selected presentations at conferences¹

- [C1] Giannerini S.; Danielli A.; Gonzalez D. L.; Goracci G. *“A role for circular code properties in translation.”*, 7th International Code Biology Conference Lužnica 31 August – 4 September 2021
- [C2] Gonzalez D. L.; Boulay J.Y.; Giannerini S.; Goracci G. *“Mathematical regularities in the genetic code: a unifying view based on symmetry and group theory.”*, 7th International Code Biology Conference Lužnica 31 August – 4 September 2021
- [C3] Goracci G., Giannerini S., Chan K.-S., Tong H. *“Testing for threshold effects in the TARMA framework”*, 7th Rimini Center for Economic Analysis (RCEA) Workshop, 25 - 26 June 2021.
- [C4] Diaz Rubio G.A., Giannerini S., Goracci G. *“On the asymptotic mean-squared prediction error for multivariate time series.”*, 50th scientific meeting of the Italian Statistical Society, Pisa 21 - 25 June 2021.
- [C5] Giannerini S., Goracci G., Chan K.-S., Tong H. *“Unit-root test within a threshold ARMA framework”*, ICEEE 2021: ninth Italian congress of Econometrics and Empirical Economics, 21 - 23 January 2021.
- [C6] Goracci G., Chan K.-S., Giannerini S., Tong H. *“Tests for threshold effects in the ARMA framework”*, eMAF2020, 18 - 22 - 25 September 2020 (invited session).
- [C7] Giannerini S., Goracci G., Chan K.-S., Tong H. *“Testing for threshold regulation”*, eMAF2020, 18 - 22 - 25 September 2020 (Keynote talk).
- [C8] Giannerini S.; Danielli A.; Gonzalez D. L.; Goracci G. *“Circular codes, codon usage and translation efficiency”*, COST Action CA17120 CHEMOBRIONICS 30/80 MEETING, Prague, University of Chemistry and Technology, January 29 - 31, 2020.
- [C9] Giannerini S.; Gonzalez D. L.; Goracci G. *“Evolution and Degeneracy in the Genetic Code.”*, 6th International Code Biology Conference 2019, Friedrichsdorf, 3 - 7 June, 2019
- [C10] Goracci G. *“Threshold Autoregressive Moving-Average models: probabilistic structure, statistical aspects and applications”*, StaTalk2019, Bologna, Department of Statistical Sciences, March 29, 2019.
- [C11] Giannerini S.; Gonzalez D. L.; Goracci G. *“A new mathematics for the origin of life, from numeration systems to the genetic code”*, COST Action CA17120 CHEMOBRIONICS 30/80 MEETING, Granada Science Park Spain, March 11 - 13, 2019.
- [C12] Goracci G.; Giannerini S.; Gonzalez D. L. *“Dichotomic Classes and Entropy Optimization in Coding Sequences.”*, Code Biology 2018, Granada, 5 - 9 June, 2018
- [C13] Chan K.-S.; Giannerini S.; Goracci G.; Tong H. *“Testing for Unit-root Non-stationarity against Threshold Stationarity”*, 2017 NBER-NSF Time Series Conference, Kellogg School of Management, Evanston, IL, September 8 – 9, 2017 (poster)

¹The first name is the presenter.

- [C14] Giannerini S.; Goracci G. “*Small Sample Asymptotics for Multinomial Goodness of Fit Tests.*”, International Meeting of the Psychometric Society 2017, Zurigo, 17 - 21 July, 2017
- [C15] Giannerini S.; Goracci G. “*Asymptotics and power of entropy based tests of dependence for categorical data.*”, 22nd International Conference on Computational Statistics, Oviedo, 23 - 26 August, 2016
- [C16] Goracci G.; Giannerini S. “*Asymptotics and power of entropy based tests of dependence for categorical data.*”, 48th scientific meeting of the Italian Statistical Society, Università degli studi di Salerno Fisciano, Salerno, 8 – 10, June 2016, (*invited session*)

Publications about the applicant

- The article “*A role for circular code properties in translation.*” has been mentioned in different press releases, some of which are mentioned below:
 - Unibo Magazine: <https://magazine.unibo.it/archivio/2021/05/31/la-teoria-dei-codici-in-aiuto-delle-biotecnologie>
 - CNR: <https://www.cnr.it/it/comunicato-stampa/10326>
 - Le Scienze: https://www.lescienze.it/news/2021/05/31/news/la_teoria_dei_codici_in_aiuto_delle_biotecnologie-4935716/

Software

[S1]	tseriesTARMA
Description	R package for the analysis of non-linear time series through TARMA models
Authors	Simone Giannerini, Greta Goracci
Status	in preparation

Membership

- Italian Statistical Society (SIS), socio ordinario, from 2021
- Italian Econometric Association (SIDE), from 2021
- Econometric Society 2019 – 2020

Involvement in European projects

Project	COST Action CA17120 - Chemobrionics supported by the EU Framework Programme Horizon 2020 http://www.chemobrionics.eu/
Position	Management Committee (substitute)
Date	October 2018 - October 2022

Peer-reviewing activity

- Journal of Econometrics
- Statistica
- Journal of Computational and Applied Mathematics

Organization and sharing of scientific events

- *Chair* at 7th Rimini Center for Economic Analysis (RCEA) time series Workshop, 25-26 June 2021
- *Chair* at 6th International Code Biology Conference, 3-7 June 2019

Experience in academic teaching

Class	Applied statistics for accounting and finance
Academic year	2021/2022 (36h)
Degree programme	Master in Accounting and Finance
Academic Institution	Free University of Bolzano-Bozen, Faculty of Economics and Management
SSD	SECS-S/01
Language	English
Contents	• Descriptive statistics • Fundamentals of probability • Random variables and probability distributions • Point estimation • Interval estimation • Hypothesis testing • Linear regression model

Lecturer

Class	Statistical Methods for Business Analysis
Academic year	2021/2022 (24h)
Degree programme	Master in Entrepreneurship and Innovation
Academic Institution	Free University of Bolzano-Bozen, Faculty of Economics and Management
SSD	SECS-S/01
Language	English

Lecturer

Class	Statistical Methods for Financial Markets (Metodi statistici per i mercati finanziari)
Academic year	2018/2019 (30h); 2019/2020 (22h); 2020/2021 (30h); 2021/2022 (25h)
Degree programme	First cycle degree programme in Finance, Insurance and Business
Academic Institution	University of Bologna, Department of Statistical Sciences
SSD	SECS-S/01
Language	Italian
Contents	• Forecasting with ARIMA models • Exponential smoothing; Volatility analysis • Tests for ARCH effects • ARCH/GARCH models • Sign Bias tests • EGARCH/TGARCH models • News Impact Curve • Overnight Indicator and Intra-Daily Volatility

Lecturer

Supervision

PhD student	Gery Andres Diaz Rubio
Academic level	PhD in Statistics (XXXIV cycle)
From / to	September 2018 / today
Academic Institution	University of Bologna, Department of Statistical Sciences
Project	Misspecification-Resistant Information Criterion for multivariate time series
Subject area	Multivariate time series & statistical modelling

Postgraduate supervision

Other academic responsibilities

Class Stochastic Processes (Processi stocastici)
Academic Year 2017/2018 (10h); 2018/2019 (30h); 2019/2020 (20h); 2020/2021 (20h)
Degree programme Second cycle degree programme in Statistical, Financial and Actuarial Sciences
Institution University of Bologna, Department of Statistical Sciences
SSD SECS-S/01
Language Italian
Activity Theoretical lessons; Exercises; Preparation and marking of exams

Teaching tutor
Class Introductory Statistics
Academic Year 2018/2019 (12h); 2019/2020 (15h); 2020/2021 (30h)
Degree programme First cycle degree programme in Genomics
Institution University of Bologna, Department of Pharmacy and Biotechnology
SSD SECS-S/01
Language English
Activity Theoretical lessons; Exercises; Preparation and marking of exams

Teaching tutor
Class Applied Statistics
Academic Year 2017/2018 (10h)
Degree programme First cycle degree programme in Business Economics
Institution University of Bologna, Department of Economics
SSD SECS-S/01
Language Italian
Activity Theoretical lessons; Exercises; Preparation and marking of exams

Teaching tutor
Class Probability II
Academic Year 2017/2018 (10h)
Degree programme First cycle degree programme (L) in Statistical Sciences
Institution University of Bologna, Department of Statistical Sciences
SSD SECS-S/01
Language English
Activity Theoretical lessons; Exercises; Preparation and marking of exams

Course tutor
From / to September 2014 / September 2015
Academic Institution University of Bologna, Department of Statistical Sciences
Responsibilities

- Manage the interaction between professors and students
- Help in the organization of academic activities

**Personal skills
and competences**

Mother tongue

*Self-assessment
European level^(*)*

English

Languages & Software

Operating Systems

Driving licence(s)

Italian

Understanding		Speaking		Writing
Listening	Reading	Spoken interaction	Spoken production	
B2	B2	B2	B2	B2

^(*) Common European Framework of Reference (CEF) level

R, \LaTeX

OSX, Windows

B

Il contenuto dichiarato in questo documento corrisponde a verità ai sensi degli articoli 46 e 47 del D.P.R. 445/2000

Greta Goracci